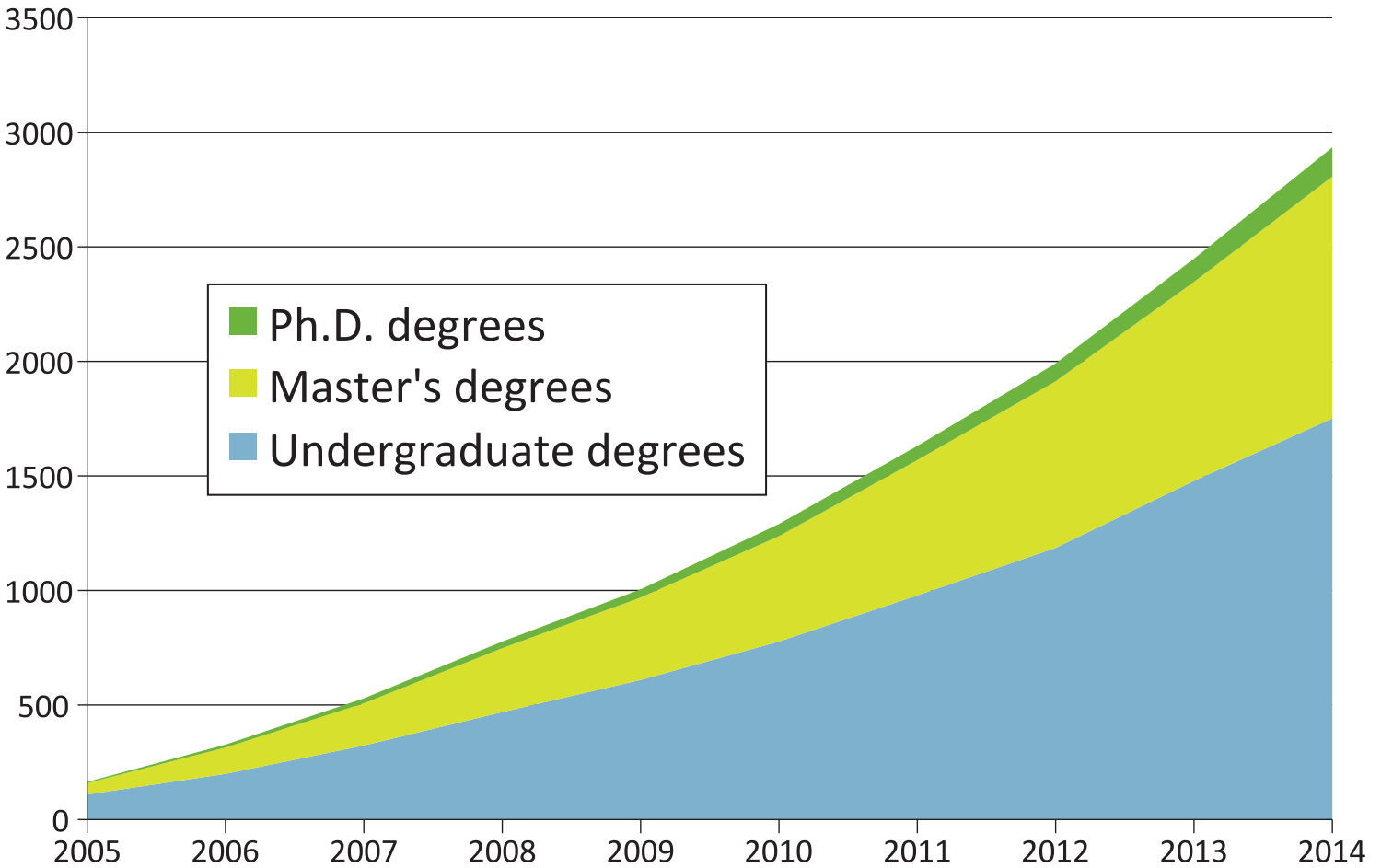


# ANNUAL REPORT 2015

## WOMEN ENGINEERS



Since its establishment, the UNT College of Engineering has added almost **3,000 Engineers** to the economy of North Texas.



An increase in applications as well as an increase in application requirements has resulted in the College admitting since 2008 an incoming freshman cohort with an average **SAT score that is higher than the previous class.**

For Fall 2015

# 24%

of the students who applied were admitted into the College of Engineering.

The average SAT scores of freshmen who enrolled in Engineering programs for **Fall 2015** were:

**MATH**  
639.1

**COMPOSITE**  
1231.5

The average SAT scores of freshmen who enrolled in Engineering programs for **Fall 2008** were:

**MATH**  
583

**COMPOSITE**  
1111.4

VS

# MESSAGE FROM THE DEAN



Alumni and friends of the College of Engineering, it is my honor to share with you this annual report, which highlights some of our outstanding faculty, students, alumni and programs.

Every week, really almost every day, I receive news of our Engineering students participating and excelling in national competitions, getting internships and jobs, or having papers and posters accepted in journals and at conferences.

I receive monthly reports of our faculty's research successes which include securing grants, mentoring doctoral and master students, serving in review panels, editing special issues of journals, or being elevated in their professional societies. Also, while I have a sense of the progress and success of our programs, it is when I receive the draft of our annual report that the totality of the progress and forward and upward movement of Engineering in North Texas sinks in.

The goal of the following pages is to give you as well this sense of forward leaps and of maturity and accomplishment that I get when I scan the contents of our annual report.

This issue of the UNT College of Engineering Annual Report focuses primarily on the accomplishments of our female faculty and students. The number of female undergraduate students in UNT Engineering has almost tripled in the past seven years, and the percentage of female students as part of the overall Engineering undergraduate student body has increased by 40% in the same period of time.

The College of Engineering has a history of outreach to potential female students, and I invite you to visit page 9 where you can read the wonderful story of Lisa Reynolds who attended our summer "Robocamp for Girls" program, first as a freshman and then as a sophomore in high school. Last year Lisa received her M.S. in Computer Science from UNT, after having received her BSCS in 2013, also from our College.

You can learn about our two newest NSF CAREER award recipients, Dr. Yan Wan from Electrical Engineering (pp. 14-15) and Dr. Hyunsook Do from Computer Science and Engineering (p. 13). You can also read about UNT's most recent Regents Professor, Dr. Nandika D'Souza, who attained this highest level for faculty in the UNT System because of her outstanding research contributions, while, at the same time, was named the 2015 Society of Women Engineers Distinguished Educator for her dedication in mentoring women engineers (pp. 20-21).

These and other stories will offer you a snapshot of UNT Engineering as it continues to excel in its mission to educate our students, generate scholarship, and serve North Texas, the State, and the Nation.

Best Regards,

Costas Tsatsoulis,

Dean, College of Engineering

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A special "Thank you" to Engineering Ambassador Calum Fletcher (see above photo or <http://engineering.unt.edu/ambassadors>) for taking several of the photos in the Annual Report and to Haley Barnes (see the Materials Science and Engineering section) for providing the cover photo.

# UNDERGRADUATE EDUCATION

Four teams from the College of Engineering took home several awards from the Spring 2015 Texas Space Grant Consortium Design Challenge (TSGC), held April 27 in League City, Texas.

Sponsored by NASA and administered by the Texas Space Grant Consortium, the TSGC Design Challenge is a unique academic experience offering undergraduate students an opportunity to propose, design and fabricate a solution to

a topic of importance to NASA and its mission. In addition to competing, the teams also had the opportunity to meet NASA astronaut Fred Haise from the Apollo 13 mission.

The team that received the most awards was illuminUNTis, which was recognized as the Top Design Team and the Audience Forum Favorite (Second Semester, a designation for those teams who have previously competed in the TSGC challenge), as well as 1st place for the Best Model



The **University of North Texas (UNT) Society of Hispanic Professional Engineers** hosted the Regional Leadership Development Conference (RLDC) on April 24-26, 2015, at UNT for the first time. The conference featured workshops and training in communication, ethics, networking, business leadership and other skills necessary in the engineering field.

Jacob Acosta, president of UNT's Society of Hispanic Professional Engineers (SHPE UNT), said that since the chapter is only five years old, hosting the conference was a big step. The event brought "a lot of attention to UNT's College of Engineering," he said.

Around 250 people attended the regional conference which provided networking opportunities for attendees. According to Alfonso Barajas, SHPE UNT Vice-President and RLDC Undergraduate Chair, members from previous SHPE UNT boards returned as professionals to help and be part of the Conference committee. "Their support really has made the biggest of difference."

In 2012, SHPE UNT was named "Outstanding Small Chapter of the Year" by the national SHPE for the growing chapter's goals and activities, and in 2013 the group was recognized by SHPE Region 5 with the Regional Involvement Award.

(Second Semester) category, 2nd place for the Best Poster (Second Semester) category, and 2nd place for the Best Oral Presentation (Second Semester) category. From left to right in the photo are: Paul Yapobi, Marina Nishimura, Alex Moore, Tyler Brown, and Maria Moreno.

The College also was represented by Team HINES, which took 3rd place for the Best Model (Second Semester) category, 3rd place for the Best Poster (Second Semester)

category, and 3rd place for the Top Design Team (Second Semester) category.

Additionally, the College's Team Rocket received 2nd place in Best Oral Presentation (First Semester, a designation for those teams competing for the first time in the TSGC challenge), and Team AD ASTRA took 2nd place in Top Design Team (First Semester).



“Joining in the Texas Space Grant was an amazing opportunity; it made me learn so many personal and professional skills (project management, communication, and leadership),”

Maria del Mar Moreno,  
Team IlluminUNTis Leader

A team of **UNT Mechanical and Energy Engineering students** was selected as one of the top three winners from the North American Region (USA and Canada) in the 2015 International Student Safety Technology Design Competition.

The Mechanical and Energy Engineering Bike Helmet team traveled to Sweden in June for the final global competition. Team members included Travis Beamon, Holly Gage, Celena Lipscomb, and Leannah Nichols.

The competition gives young scholars from Asia-Pacific, Europe, and North America an opportunity to design, build, and demonstrate a cost-effective conceptual scale model of a vehicle safety technology.

During the regional competitions, teams were required to design and build the scale model, as well as prepare a report of the design and a corresponding presentation. A panel of safety experts evaluated the design and selected the team finalists.

The finalists' prototype devices were on display in the Exhibition Hall at the International Technical Conference on Enhanced Safety of Vehicles in Gothenburg, Sweden.

Lipscomb said although the UNT team was not one of the winners of the international competition, “I am grateful for the amazing opportunity to network with engineers and engineering students from all over the world that the Enhanced Safety of Vehicles conference gave us.”

# GRADUATE EDUCATION

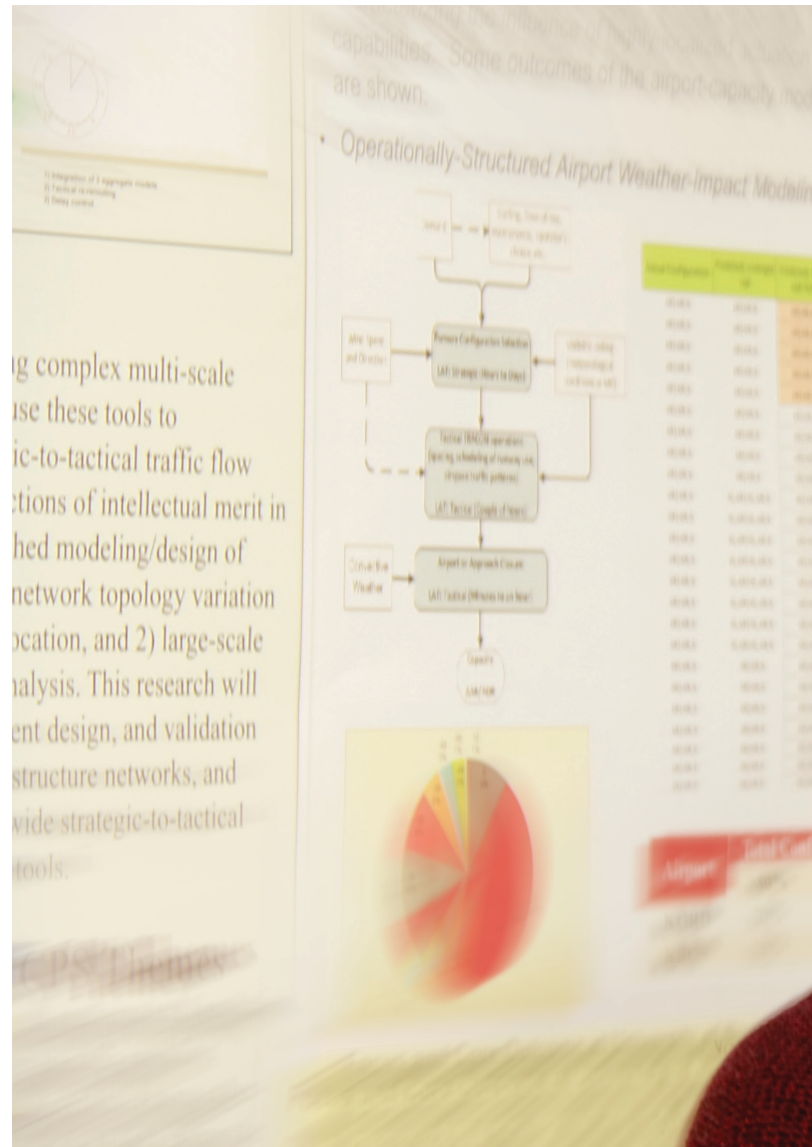
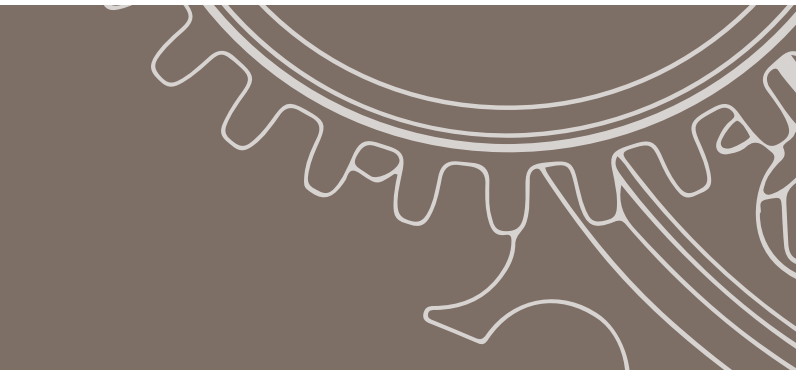
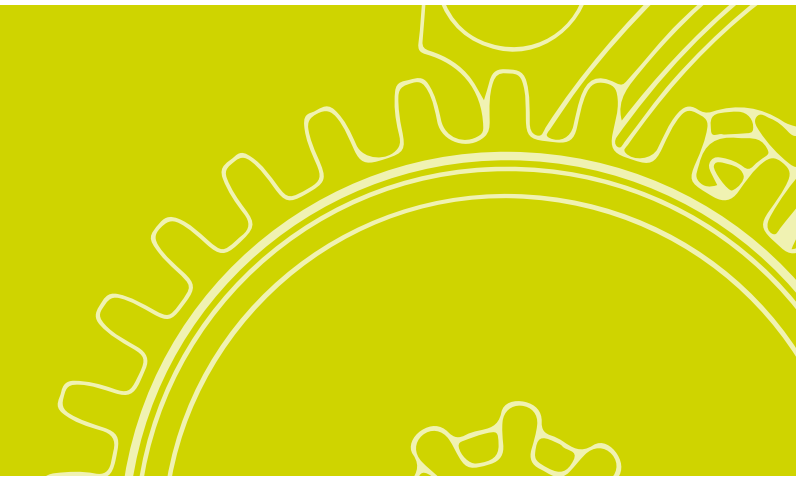
Junfei Xie is a Ph.D. candidate student of the Department of Computer Science and Engineering (CSE), and her research interests include dynamic system design and control, managing and mining big spatiotemporal data, airborne networks, complex information systems, air traffic flow management, wireless sensor networks, and network security.

She has presented her work at top conferences in the transportation field such as AIAA (American Institute of Aeronautics and Astronautics) Infotech, IEEE (Institute of Electrical and Electronics Engineers) MILCOM, and AIAA Aviation. Additionally, Xie was recognized with the best

poster presentation at a National Science Foundation-funded workshop on airborne networks in 2013 and received second place at the IEEE MetroCon student poster competition in 2014.

Xie also is the 2015 recipient of the Wanda J. Shafer Graduate Scholarship, awarded by the Dallas/Fort Worth Chapter of the Women's Transportation Seminar (WTS) to encourage women to pursue career paths in transportation.

The Wanda J. Shafer Graduate Scholarship was instituted in 2002 in honor of the first chapter president of the Dallas/Fort Worth WTS. It is issued to one awardee per year in the



The October-November 2015 issue of the *American Ceramic Society Bulletin*, one of the most popular and widely read magazines in the materials and ceramics community, features an article by **Materials Science and Engineering graduate student Jessica Rimsza**.

In her article, "Lithium silicate research, baby pandas, and green tea: Strengthening international research through immersion," Rimsza discusses her international research experience as a National Science Foundation (NSF) East Asia Pacific Summer Institute (EAPSI) Fellow.

The fellowship allowed Rimsza to travel to Chengdu in the Sichuan Province of China to work with Xiaotao Zu and

Haiyan Xiao at the University of Electronic Science and Technology of China. At the university, Rimsza conducted computational materials science research involving the use of density functional theory simulations to study lithium silicate ceramics.

In the article, Rimsza stated that the EAPSI fellowship gave her another opportunity for international research collaboration, and she looks forward to additional international research in the future. In 2014, support from the NSF International Materials Institute on New Functionality of Glasses enabled Rimsza to conduct research at Pierre-and-Marie-Curie University in Paris.

North Texas-Oklahoma area. Xie's research advisor, Dr. Yan Wan (an Associate Professor of the Department of Electrical Engineering), informed her about the scholarship.

"Yan Wan has been a good advisor and has provided a lot of support," Xie said. "It is good to have two women advisors, Dr. Yan Wan and Dr. Yan Huang from the CSE Department, who are both role models for me."

In addition to an interest in transportation-related research, Wanda J. Shafer scholarship recipients possess leadership abilities. Xie stated that she has also made great efforts to

spark students' interest in transportation. She supervised a freshman class of 32 students during her junior year, and was invited seven times to give seminars to inspire students to pursue research and guide them into transportation fields.

Xie received a bachelor's degree from the University of Electronic Science and Technology of China, Chendu, China in 2012 and her master's degree from the University of North Texas in 2013. She plans to pursue a career path in academia, and to continue to make contributions to the transportation field.



**"UNT has a lot of resources to help you explore your abilities, and the people are very supportive."**

**Junfei Xie,  
Graduate Student**



**Shanti Thiyagaraja, a Computer Science and Engineering graduate student** in Dr. Ram Dantu's Network Security Lab, won first place in the Spirit of Innovation Competition, sponsored by the US India Chamber of Commerce DFW (USICOC), on Dec. 4, 2014. Thiyagaraja received \$5,000 for her presentation on "Smart Phone Monitoring of Second Heart Sound Split."

TheUSICOC Spirit of Innovation Competition seeks to encourage technology innovation and entrepreneurship

and to support professional and business development throughout the Dallas-Fort Worth Metroplex. This competition brings together students from local universities and gives them the opportunity to showcase their innovative business ideas. For 2014, 29 submissions were reviewed by a panel of judges. Ideas were assessed based on feasibility, originality and background research. Eight finalists were selected to present their concepts to the judging panel at Texas Instruments.

# ALUMNI

Cheryl Miller (1983, B. S. Computer Science) says that her career has allowed her to do what she loves, which inspires her to be a lifelong learner of her profession.

Miller has worked for more than 23 years at AT&T (formerly Southwestern Bell Corporation), where her current job title is Principal-Technical Architect. Her work involves automation development, architecture, and Oracle Database Administration, and she said she enjoys being able to develop solutions that help simplify tasks people do during their workday.

"I love what I am doing, being able to build things in my mind," she said.

Her career achievements include a U.S. Patent (#8,620,871) for a process to automatically discover and determine database component usage for midrange and windows servers. Miller's work at AT&T includes co-development of the AT&T Database of Databases repository, participation in development and oversight of AT&T Oracle security standards and processes, and development and support of enterprise-focused Oracle Enterprise Manager infrastructure.

Miller said that she is grateful for the Computer Science education she received from the University of North Texas (UNT) and the career paths opened for her. Although Miller was more focused on obtaining her degree while at UNT, she said she has come to appreciate continued personal



An inscribed brick with the name **Mayaria Johnson**, Computer Science and Engineering alumna, was placed in the UNT Alumni Pavilion for receiving the University of North Texas (UNT) 2014-2015 Women Breaking Barriers Award. Johnson is the former president of the UNT Society of Women Engineers student section. In 2014, the UNT Society of Women Engineers co-hosted the Design Your World STEM Conference for Girls at UNT Discovery Park. More than 100 6-12th grade

girls participated in this conference. As the President of the UNT Society of Women Engineers, Johnson led the Computer Science/Technology activities. She currently works as a Business Solutions Delivery Assistant Analyst at PepsiCo in Frisco, Texas. Johnson was a UNT PepsiCo Undergraduate scholarship recipient and participated in a REU (Research Experience for Undergraduates) program during the summer of 2013.



development beyond the classroom. "You have to stay relevant; it is more important now than ever."

Miller credits her father, who worked at IBM from the 1960s to the 1980s, for sparking her interest in computer science. After he transferred from Chicago to Dallas, he encouraged her to move as well, and she enrolled at UNT. Miller said she liked programming classes at UNT in which she learned how to code and learned about programming languages like Pascal.

Since then, Miller has continued to develop her skills and to obtain certifications, and now she is working towards a Masters in Computer Science as a member of the initial pilot cohort of Georgia Tech's new Online Master's of Computer

Science program. She is specializing in Machine Learning with a focus on Data Science/Analytics with a target graduation date of May 2016. "I find it fascinating these days how much more integrated math concepts are with algorithm design and Machine Learning," she said.

In 2015, Miller attended the Grace Hopper Celebration of Women in Computing conference. She said that the conference provided her with ideas that she could take back to AT&T, which has an organization for women in technology, that along with AT&T is committed to STEM education and careers for women.

**"I would stress how important it is to be a lifelong learner. Don't let age be an impediment to continuing your education."**

**Cheryl Miller,  
Alumna**



In 2015, **Lisa Reynolds** became the first of the former University of North Texas (UNT) Robocamp student participants to receive a M.S. degree in computer science from UNT. Robocamp is a summer day camp for students entering grades 8-12, and Reynolds attended Robocamp as a freshman and a sophomore in high school. She enrolled in UNT's CSE program and received her B.S. in Computer Science in 2013. Reynolds defended her thesis, "An Empirical

Study of Software Debugging Games with Introductory Students," on June 23, 2015. While a UNT student, Reynolds worked as a camp counselor at Robocamp. "My first summer in college I got a job helping teach Robocamp," she said. "At first I felt a bit out of place being in charge of students who were often nearly as old as I was, but my coworkers were always ready to help me out."

# BIOMEDICAL ENGINEERING

Stormie Garza is a Biomedical Engineering sophomore, and she is already conducting research with faculty advisor Dr. Vijay Vaidyanathan, the chair of the Biomedical Engineering Department.

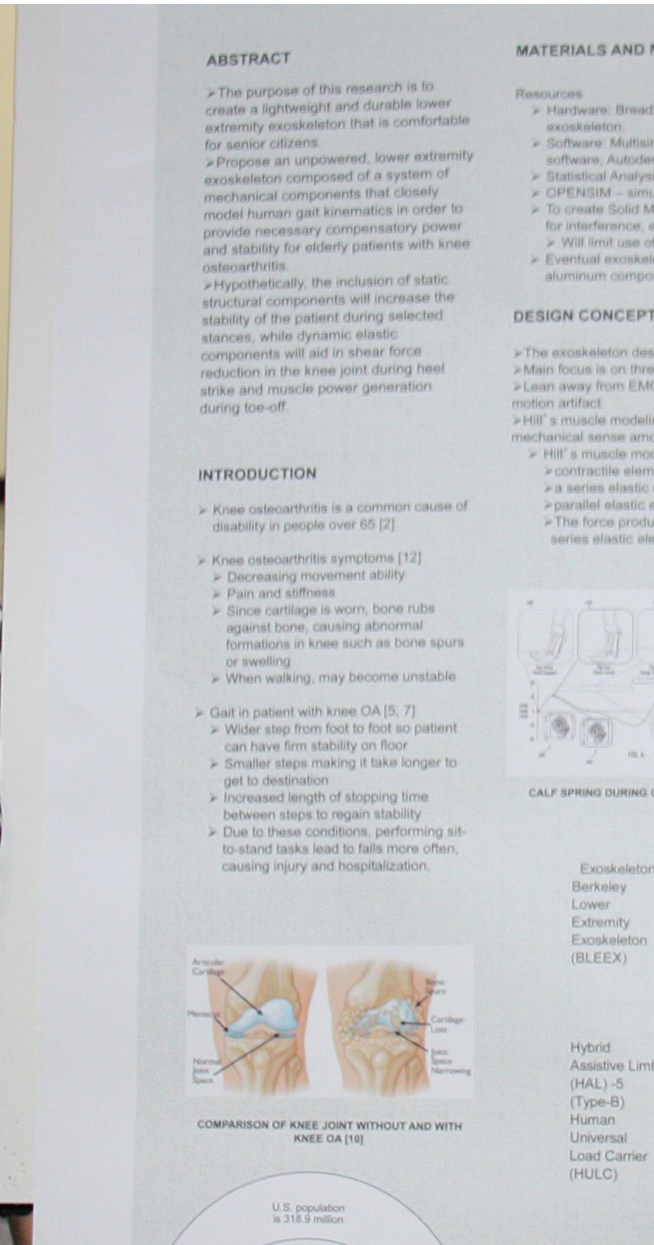
Most recently, she participated in a McNair poster presentation and received 3rd place at the Showcase of Undergraduate Research in Engineering (SURE), held Nov. 6, 2015, at UNT's Discovery Park, for her poster presentation "Design of a Lower Extremity Exoskeleton to Improve Gain in Patients with Knee Osteoarthritis by Reducing Knee Joint Loading."

Garza is among the students who joined the Department of Biomedical Engineering (BMEN), the sixth department of the University of North Texas (UNT) College of Engineering, during its inaugural year. She chose Biomedical Engineering not only because she loved math but also because she wanted a major in which she could help people.

Garza was named salutatorian at Early College High School in Harlingen, where she took college-level courses, and was accepted into UNT's McNair and Terry Scholar programs. She found out that the new Biomedical Engineering Department was accepting freshmen when she was applying for a Terry

"I want to change the way prosthetics are made through research of their materials."

Stormie Garza,  
Undergraduate Student



The female student population of the Department of Biomedical Engineering is 29 percent, which is more than twice the percentage of the overall female student population of the College of Engineering. While biomedical engineering is one of the engineering disciplines that tends to attract more female students, the new University of North Texas (UNT) department has a high quality cohort of female students including a Terry Foundation and McNair scholar and

a member of UNT's women's basketball team. In addition, Mechanical and Energy Engineering graduate student Jenn Cao, who was an undergraduate researcher for Shriners Hospitals for Children, is working on her MS thesis with Dr. Vijay Vaidyanathan on the development of a lower extremity exoskeleton for the elderly. The Biomedical Engineering students also have founded the UNT student chapter of the Biomedical Engineering Society.

Foundation Scholarship and researching the University of North Texas. "This was perfect timing," Garza said.

On Aug. 25, 2014, the college welcomed its first BMEN class, "Discover Biomedical Engineering," a discovery course taught by Vaidyanathan. Garza said that although the class was big, the students got to know each other. Also, she liked seeing the different results from the various group projects assigned to the students. She's also joined UNT's student chapters of the Society of Hispanic Engineers and Biomedical Engineering Society.

"The department is brand new, but Vijay is making it stand out," Garza said.

The department will launch the graduate program in Biomedical Engineering in Fall 2017. The graduate degree will include an option to obtain a certificate in health services management in collaboration with the UNT Health Science Center.

Garza said that her future research interest is prosthetics and she is considering pursuing a doctorate in Biomedical Engineering. "I would not want to go into any other major,"

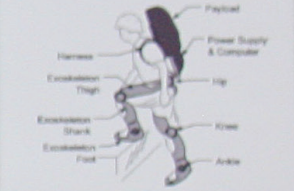
Denton, Texas

**METHODS**

boards, microprocessor development boards, materials for  
n, LabVIEW, MATLAB, Biopac, COMSOL, Biomechanics  
sk Inventor and ANSYS for simulation and modeling.  
s: ANOVA  
lator based on Hill's Muscle Model  
odels: use 3D printing for mini model for the purpose of testing  
lastic springs, cords, etc.  
3D printer to commercially available products  
ton may be composed of products such as a carbon fiber and  
ite

**DISCUSSION - continued**

- > Studying factors attributing problematic issues provide solutions to improving the mobility of knee OA patients
  - > Main focus- Knee joint loading in muscles
  - > Muscles in lower extremity joints tend to decrease in power due to knee OA symptoms [6]
  - > Power and stability can be increased in the lower extremity using powered and unpowered lower extremity exoskeletons [4, 8]
  - > Such projects have shown up to a 7% increase in metabolic efficiency during gait cycles [4]
  - > In previous exoskeletons researched, most use some form of Hill's muscle model.
  - > BLEEX [3,8]
    - > Transfers the weight to the ground instead of the user
    - > Uses linear actuation
    - > Design of the exoskeleton around the wearer allows for it to follow the wearer's movements



**BERKELEY LOWER EXTREMITY EXOSKELETON (BLEEX) [8]**

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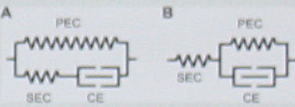
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**GAIT CYCLE OF FOCUS [13]**



**HILL'S MUSCLE MODEL BASIC CIRCUIT DESIGN [11]**



Purpose	Properties	Dimensions
load carrying	walks at the	
human	average	
exoskeleton	speed of	
used by	0.9 m/s	
soldiers,	disaster relief	
workers, etc.	while carrying a	
	34 kg	
	payload	
help a patient	payload up	Height: 1600 mm
with	to 75 kg	Weight: 23 kg
paraplegia		
walk upright		
Used by	payload up	Height: 5'4" to 6' 2"
soldiers for	to about 91	Weight without
combat loads	kg	batteries: about 10
Heavy load is		kg
transferred to		
ground		

**The Industrial Advisory Board of the Department of Biomedical Engineering** comprises local industry leaders from companies such as Alcon Laboratories, Inc., Styker Communications, Paramount Cardiovascular Associates, CRB Engineers, Testech, Sleeping Well Solutions, OPEXA Therapeutics, Medtronic, Texas Instruments, and Orthofix. The board also includes a cardiologist and senior representatives from UT Southwestern Medical Center. The board has ratified

the curriculum and provided invaluable feedback on additions to the curriculum that will enhance the engineering skills and expertise of the students to succeed in the field of Biomedical Engineering.

Members of the Industrial Advisory Board also have been actively involved in the department, by giving guest lectures in classes. Some board members have expressed an interest in teaching as adjuncts.

# COMPUTER SCIENCE AND ENGINEERING

Dr. Cornelia Caragea, an Assistant Professor of the UNT Department of Computer Science and Engineering, is a researcher with expertise in machine learning, data mining, and information retrieval.

The overarching goal of her research is to improve our ability to effectively and efficiently mine and discover knowledge from large amounts of digital data, which are available during these "big data" times. "As more and more data become accessible, a greater need exists for tools that can allow for efficient processing of more information in less time," Caragea said.

Pursuing this research, Caragea has been instrumental in generating more than \$1.1 million in research funding from 5 NSF awards that she received since she joined UNT in Fall 2012.

One of her NSF projects, Keyphrase Extraction in Document Networks, addresses the issue of automatic keyphrase extraction from research papers. Using document networks, this project seeks to develop accurate approaches that automatically discover and extract keyphrases in documents. The output of this project has the potential to help researchers navigate through the large number of research papers that are available today.



**Associate Professor Dr. Renee Bryce** received the Undergraduate Research Mentoring Award from the National Center for Women & Information Technology (NCWIT) in May 2015. This award is presented to faculty members who conduct research with undergraduate students and embody the objectives of NCWIT: individual or team research experiences, including undergraduate women, leading to student accomplishment and professional success.

Bryce encourages students to develop research skills and the enthusiasm to pursue graduate school. Bryce co-chaired

the poster session for the Grace Hopper Conference in which there were more than 150 posters. Thirteen of her students have been funded by CRA-W CREU grants including the USU Best Honors Thesis Award. In addition, 97 percent of the undergraduates she has mentored have earned a Computer Science degree, and 37 percent have entered graduate school. Of her undergraduate protégés, 62 percent are female and 27 percent are members of underrepresented groups.

In another NSF project, TWC: Small: Collaborative: Towards Privacy Preserving Online Image Sharing, Caragea addresses privacy issues of images that are shared online. These privacy issues, which can affect both the owner and other subjects in the image, include the unintended disclosure of aspects of users' private lives. A goal of the project is to develop a framework that will enable an understanding of the images that need protection. Through analysis of thousands of images, tools can be developed for social networks to flag sensitive content and to help improve user awareness of classes of images that are often unintentionally or accidentally under-protected. "This research will also help social networks

provide better features to help users to maintain privacy," Caragea said.

In her most recent project, CHS: Small: Collaborative Research: Automating Relevance and Trust Detection in Social Media Data for Emergency Response, Caragea will develop methods to measure content shared on social media for relevant and verifiable information that can be forwarded to emergency response and disaster relief organizations.

"The goal of the project is to help not only the first responders to allocate their efforts efficiently but also the victims on the ground who are in dire need and seeking help," she said.



"I believe that finding meaningful solutions to real-world problems will likely come from mining and aggregating large amounts of digital data, which I specifically address with my research agenda."

Dr. Cornelia Caragea,  
Assistant Professor

**Associate Professor Dr. Hyunsook Do** received a National Science Foundation CAREER Award for her project "Context-aware Regression Testing Techniques and Empirical Evaluations of Their Economic Impact." To ensure the quality of modified software systems, software engineers perform regression testing. However, these tests can be expensive depending on the size and complexity of the systems. Despite efforts to address the cost-effectiveness of regression testing, three important issues have not been considered: factors involving the context in which testing occurs; assessment of regression techniques across entire system lifecycles; and proper economic models that capture important cost factors

as well as quantify benefits of regression testing techniques and strategies.

Do's research will build a foundation for evaluating the cost-effectiveness of various regression testing techniques and strategies. The research includes the following activities: creating cost-effective regression testing techniques that address the testing process and domain contexts; creating regression testing strategies that address system lifecycles; creating economic models that enable the adequate assessment of techniques and strategies; and evaluating and refining these techniques and strategies through rigorous empirical approaches.

# ELECTRICAL ENGINEERING

The research of Dr. Yan Wan, an Associate Professor of the Department of Electrical Engineering, has been funded by a number of grants from the National Science Foundation (NSF), the National Institute of Science and Technology, the MITRE Corporation as subcontracts from the Federal Aviation Administration, and the Institute of Electrical and Electronics Engineers. In 2015, she received an NSF Early Career Development (CAREER) award.

The NSF CAREER Award is the NSF's most prestigious award for junior faculty members who demonstrate outstanding

research, excellent education, and the integration of education and research within the context of the mission of their organizations.

Over the next five years, Wan will receive funding from the NSF to develop an innovative theoretical framework for cyber-physical systems (CPS) that will enable airborne networking, which utilizes direct flight-to-flight communication for flexible information sharing, safe maneuvering, and coordination of time-critical missions.



**Dr. Gayatri Mehta, an Associate Professor of the Department of Electrical Engineering**, is the director of the Reconfigurable Computing Lab at the University of North Texas, and she and her research team are working on developing highly visual, interactive, game-like design environments that can be used to design and explore low energy architectures for next-generation portable electronics. The team developed an interactive mapping game called UNTANGLED. Playing UNTANGLED can uncover human mapping/placement strategies. The game has been online since May 2012, and players have generated more than 11,000 solutions. Mehta

and her team have analyzed players' mapping strategies and have created algorithms that outperform the long-term standard solutions by a significant amount. After the success of UNTANGLED, the team developed a prototype of an architecture design game called UNTANGLED II: Unbound. The game has been online since February 2014, and it puts a vast array of design choices into the hands of players in a visual manner. Mehta believes that great insight can be gained by making the design exploration process very visual and hands-on.

This research will contribute to a safer airspace by equipping unmanned aerial vehicles (UAVs) with low-latency communication and situational awareness capabilities. Additionally, new civilian UAV applications that rely on the robust tasking of multiple UAVs will be created based on the research.

"Robust networking of airborne networks is challenging, considering the high mobility of UAVs, safety constraints, and the uncertain airspace environment," Wan said. "The

fundamental theory is lacking. My research develops a theoretical paradigm that exploits the mutual benefits of networking and decentralized mobility control, instead of viewing them as constraints for each other. The paradigm smartly exploits uncertainty, mobility, and network structure to achieve high-performance networking and decentralized control."



**The Department of Electrical Engineering (EE)** commemorated its 10 year anniversary on Oct. 16, 2015, with a party at UNT's Gateway Center and invited its alumni to join in the celebration. Along with the anniversary, 2015 also marked the year that the department welcomed its first group of Ph.D. students. EE's Ph.D. program, which was approved earlier in 2015, has the unique feature of an integrated entrepreneurship component.

This program continues a tradition of innovative curriculum and research by the department. When the EE Department

was founded in 2005, a proposal with an operational plan for integration of project-based EE education and life-long learning pedagogy received generous support from the National Science Foundation (NSF). Since its founding, the EE Department, its faculty, and students continue to receive national recognition including: Jennifer Williams, NSF Graduate Research Fellowship, Katie Schniebs, NASA Aeronautics Scholarship, and Adriana Blanco, GE Women's Network Scholarship.

# ENGINEERING TECHNOLOGY

Dr. Diane DeSimone is a Senior Lecturer of the Department of Engineering Technology. She has extensive experience in "green building" and specializes in the business side of the construction industry including methods, materials, estimating and contract documents. DeSimone owned and operated a residential construction company that specialized in structural insulated panel (SIP) construction and energy efficiency. She won an award in Materials Management and Energy Efficiency and received recognition by the

Texas Senate for contributing to the advancement of green building processes.

Most recently, DeSimone and 60 entry-level students in the Construction Engineering Technology (CNET) program, as well as two graduate teaching assistants and two volunteers, had the opportunity to work on two model buildings that will allow researchers to study energy efficiency in buildings. The buildings are scale replicas of the University of North Texas (UNT) Zero Energy Laboratory (ZOE), a facility which was



"The project was a great learning experience and forced everyone to think through the issues so that fixing one problem didn't create new ones."

Dr. Diane DeSimone,  
Senior Lecturer



Dr. Shuping Wang is an Associate Professor of the Department of Engineering Technology (ETEC), and her research is conducted at the ETEC Photonics Research laboratory, which is equipped with state-of-the-art hardware and software. Wang's research interests include biomedical engineering, biomedical optics, electronics instrumentation, and optics. After a successful collaboration with the Optics & Microelectronics Division at Sanmina Corporation in 2013-2014 on the Development of Innovative Optical Metrology Techniques and Apparatus, Sanmina and Wang teamed up

again in 2015 to investigate the possibility of using a moldable air cure-filled RTV (room temperature vulcanization) to form custom fiber-bending in telecommunication applications. The project tackles the challenges the optical communication industry faces when packaging optical fiber product into a house with limited room for a conventional rubber boot. The preliminary results look promising, and further long-term reliability test in accordance with the Telcordia standards will be conducted.



designed specifically to test various energy technologies and systems in order to achieve a net-zero consumption of energy. The models were built at the request of Drs. Yong Tao and Nandika D'Souza, who wanted identical units that could be used for mechanical and energy engineering testing.

CNET students take an entry level set of courses that gives them hands-on experience in "real-world" building. In these courses, CNET 1160 (Construction Methods and Materials) followed by CNET 2180 (Construction Methods

and Surveying), the students start with blueprint-reading and continue through the process of building the models from framing to the finishing work of sheetrock, trim, and paint.

DeSimone said that the hands-on coursework gives the students an understanding of the building process. "We are not trying to make framers, plumbers, or electricians out of them – just let the students experience what it takes as knowledge needed for their future careers," she said.



**Dr. Leticia Anaya, a Senior Lecturer of the Department of Engineering Technology**, is featured on the Latina Style Magazine website in an article called "Latinas Making Their Mark in STEM Fields." Anaya has more than 15 years of experience teaching engineering and engineering courses for the University of North Texas (UNT). She teaches both undergraduate engineering courses and graduate level engineering management courses. She also is the interim

director of the UNT Latina/o and Mexican-American Studies program and the co-advisor for the UNT Society of Hispanic Engineers. Additionally, Anaya has extensive experience creating mechanical prototypes for industry and was the faculty advisor for the Society of Automotive Engineers at UNT (SAE UNT), an organization that developed the first Formula SAE vehicle that allowed the UNT College of Engineering to compete in a Formula SAE competition.

# MATERIALS SCIENCE AND ENGINEERING

Haley Barnes, a Materials Science and Engineering (MTSE) undergraduate, was selected to be one of 20 national Society of Women Engineers' Future Leaders for fiscal 2016.

The goal of the Society of Women Engineers Future Leader (SWEFL) Program is to provide promising young SWE members with opportunities, information, and encouragement to continue in SWE as an active participant and leader. The program also aims to offer professional development and leadership training for each SWEFL to advance and to

develop individual leadership styles. SWEFLs are required to attend national and regional conferences, leadership webinars, and regional conference calls to truly experience the internal works of SWE.

The SWEFL program focuses on providing training and opportunities to promising young collegiate leaders with at least two years left in a collegiate program. Candidates for SWEFL nominations should be active collegiate members of the society and should have exhibited strong leadership



The sixth **North Texas Inter-University Symposium on Materials Science and Engineering** attracted more than 30 students to participate in competition at the University of North Texas (UNT) on April 15, 2015.

The event, which was sponsored by the American Society of Materials (ASM) North Texas Chapter, rotates among three major universities in the DFW area: UNT, the University of Texas at Dallas (UT Dallas), and the University of Texas at Arlington (UT Arlington). The competition consists of oral and poster

presentations by students, and the winners in both categories are recognized at an awards ceremony that evening.

The oral presentation winners of the 2015 symposium were: 1st Prize: Sina Moeendarbari (UT Arlington), 2nd Prize: Xiaonan Lu (UNT), 3rd Prize: Susmitha Sayana (UNT), and 4th Prize: Baozhuo Zhang (UNT) and Bharat Gwalani (UNT). The poster presentation winners were: 1st Prize: Aditya Ayyagari (UNT), 2nd Prize: Nandhinee Radha Shanmugam (UT Dallas), and 3rd Prize: Minghui Zhang (UT Arlington).

potential and interest in extended involvement in the society beyond the collegiate experience.

Barnes, a junior and an active member of SWE, serves as the UNT student chapter's Vice President. She is also a College of Engineering Senator for the UNT Student Government Association, an active member of the North Texas 40, an organization of the "Top 40 Leaders" on campus because of their high levels of involvement in student organizations and off-campus organizations, a member of the Discovery

Park Student Affairs Advisory Board, and the founder of UNT Compliments, a positive social media experience for UNT.

She also was the winner of the American Ceramic Society Writing Competition, and her prose appeared in an issue of the Bulletin of the American Ceramic Society, which is a widely subscribed magazine of the ceramic and materials community.



**"As it is up to the SWEFL to pursue each opportunity she is given, I am excited to network nationally, regionally, and locally with fellow SWE-sters and pursue my goals of celebrating professional women engineers in my region."**

**Haley Barnes,  
Undergraduate Student**

**Ph.D. student Xiaonan Lu** is researching chemical durability of high-level nuclear waste glass. "Vitrification is an effective way to dispose of nuclear waste, which researchers all over the world have been studying for decades," she said. "The idea of stabilizing radioactive nuclides into glass matrices fascinated me, and I feel excited to be able to learn more about it and hopefully to be able to contribute a little bit of my efforts into this project."

Lu received her inorganic nonmetallic materials engineering bachelor's degree from Shanghai University, China, in 2012, and chose UNT for her doctoral work because

of the supportive faculty. "They are always available and patient to answer my questions."

She is a research assistant with faculty advisor Dr. Jincheng Du, who has supported her work as an alternate sponsored fellowship (ASF) at the Pacific Northwest National Laboratory for about two months in summer 2014.

Lu also attended the 2015 Nanoscale Ordered Materials Diffractometer Workshop (NOMAD) held by Oak Ridge National Laboratory and was the 2nd place winner of the oral presentations at the sixth North Texas Inter-University Symposium on Materials Science and Engineering.

# MECHANICAL AND ENERGY ENGINEERING

Dr. Nandika D'Souza has earned numerous awards including the University of North Texas (UNT) Research Leadership Award, the UNT College of Engineering Research Award and the Vinyl Division Thesis Award from the International Society of Plastics Engineers.

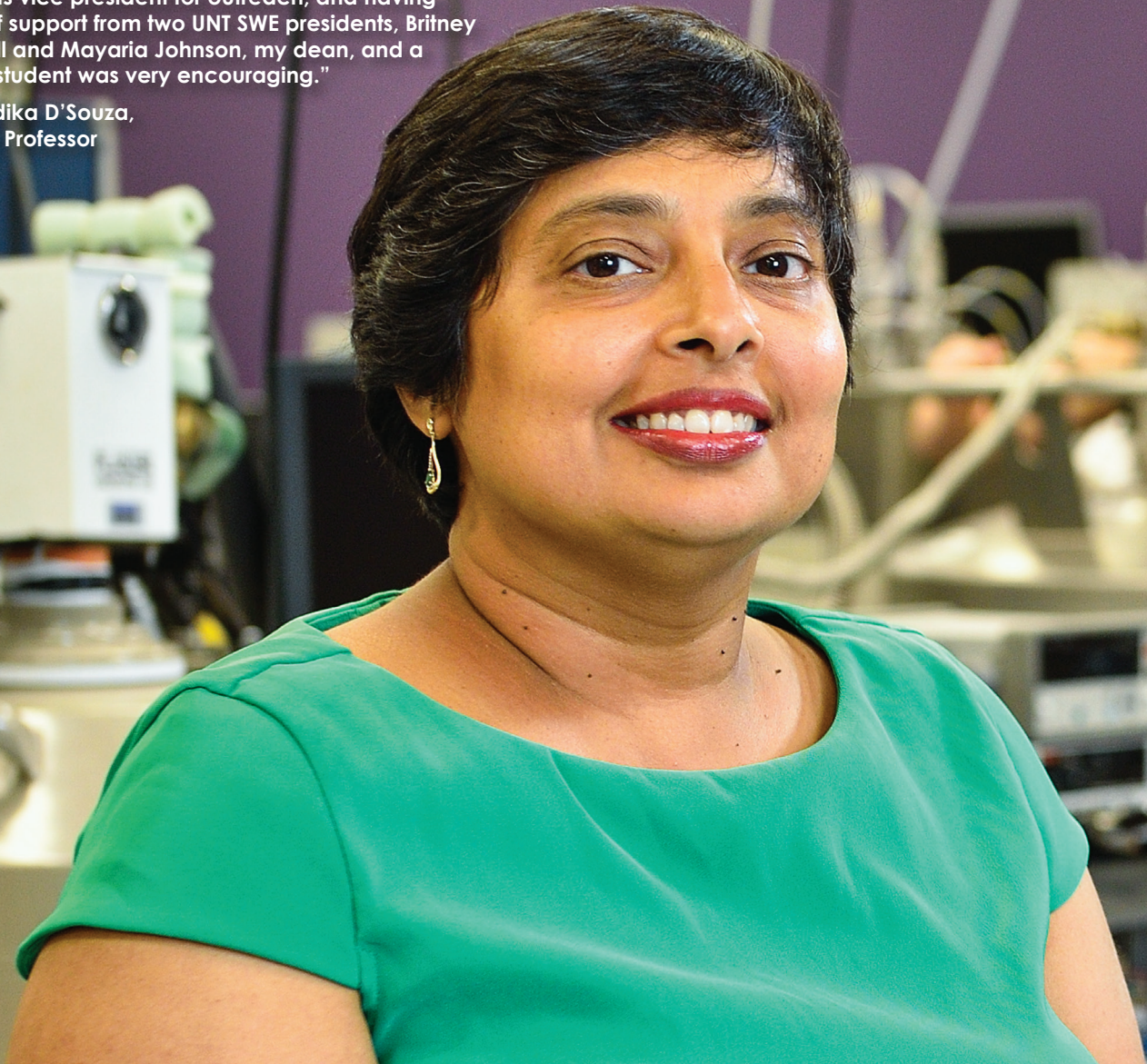
In 2015, D'Souza was appointed the College of Engineering associate dean of undergraduate studies, received the designation of UNT Regents Professor, and was named the 2015

Society of Women Engineers (SWE) Distinguished Engineering Educator. The SWE award is presented to educators who make significant contributions to the engineering field.

D'Souza, who advises the UNT SWE student organization stated, "The future for women engineering students at UNT is bright. Enabling an educational environment where students of all races and genders can fulfill their potential requires a proactive approach from faculty, staff and students. Ensuring

"Being nominated by the Dallas Section of SWE, where I serve as vice president for outreach, and having letters of support from two UNT SWE presidents, Britney Caldwell and Mayaria Johnson, my dean, and a current student was very encouraging."

Dr. Nandika D'Souza,  
Regents Professor



**Six Mechanical and Energy Engineering (MEE) students,** Jalyn Nickerson, Sara Peña, Billy Davis, Lex Schindler, John Mora, and Troy Eakins, participated in a two-week field trip to China in the summer of 2015 to learn more about green buildings and renewable energy.

The field trip was part of a lecture/research/project-based summer course. The China visit included lectures given by invited professors from top Chinese Universities as well as lab activities at Tongji University, Zhejiang University and the UNT's

American House in Beijing. Students also had the opportunity to interact with Chinese students on research projects while staying at the International Center for Bamboo and Rattan in Beijing and at Tongji University.

Along with educational activities, the students also were treated to fun activities and sightseeing trips. The class was co-taught by Dr. Yong X. Tao, MEE Chair, and Dr. Xiaohua Li, MEE Lecturer, who have conducted this study-abroad course since 2012.

academic excellence and personal confidence in diverse populations can change the demographics of our leaders.”

D'Souza has worked with undergraduate and graduate students in the area of failure analysis, viscoelasticity and material reliability. Her teaching and research focus on mechanics and materials and how best to incorporate them reliably in design. Also, D'Souza has published more than 160 book chapters, journal articles and peer-reviewed

conference proceedings. She is a Fellow of the Society of Plastics Engineers for her contributions to the field of polymers, composites, fibers, films and coatings. Additionally, D'Souza was named the 2009 Engineer of the Year by the American Society of Mechanical Engineers Electronics and Photonics Packaging Division.



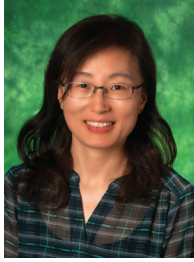
**Students from MEEN 4150 Senior Design are re-designing and improving a concrete breaking machine called an EZ Breaker.** The EZ Breaker is a construction machine that uses a hydraulic ram to break concrete, tile, or masonry up to 14 inches deep. The project is sponsored by Stout International, LLC which contacted the University of North Texas (UNT) for assistance with the redesign activity.

The EZ Breaker equipment was originally designed and built in the 1980s with great regional success. Stout International is working with Mechanical and Energy Engineering Department students to improve and modernize the design so that production can begin in 2016.

The student design team met with Dr. Stan Case, the owner of a number of the EZ Breaker units, for a briefing on the use and history of the equipment. The EZ Breaker was also demonstrated to the students, and the group discussed design and reliability improvements as well as ideas for safety improvements. The design team has weekly conference calls with the sponsor to give updates on progress and to exchange ideas.

Improvements to the machine will be built and tested in the spring 2016 semester.

# NEW FACULTY



## Hyunsook Do

Associate Professor, Computer Science and Engineering

Ph.D.: Computer Science, University of Nebraska-Lincoln, 2007

Expertise: software engineering, particularly software testing, maintenance, and empirical methodologies.

Do's current research is focused on 1) creating cost-effective regression testing techniques that address the testing process and domain contexts, 2) creating regression testing strategies that address system lifetimes, 3) creating economic models that enable the adequate assessment of techniques and strategies, 4) empirical methodologies to evaluate the costs and benefits related to testing techniques considering various factors such as testing context and a system's lifetime, and 5) empirical evaluation which involves various research questions on software testing techniques and problems.



## Robin Pottathuparambil

Lecturer, Computer Science and Engineering

Ph.D.: Electrical & Computer Engineering, University of North Carolina at Charlotte, 2013

Expertise: building field-programmable gate array-based hardware accelerators for computational science applications. He also has worked on developing scientific applications for multi-core architectures.

Prior to his graduate studies, Pottathuparambil worked for three years in industry building embedded systems for medical equipment, home security systems, and wireless sensor nodes.



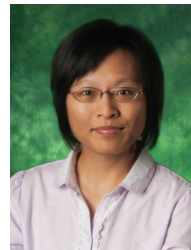
## Andrey A. Voevodin

Professor and Chair, Materials Science and Engineering

Ph.D.: Materials Science, Tula Technical University, Russia, 1991

Expertise: thin films and coatings, plasma processes, surface engineering, surface analysis, electrical, thermal, and mechanical interfaces.

Voevodin previously had been the Research Team Leader of the Nanoelectronic Materials Branch of the Air Force Research Laboratory. Among his accomplishments are about 300 technical publications and 12 patents which include "Nanoparticles and Corona Enhanced MEMS Switch Apparatus", "A Filtered Cathodic Arc Plasma Source", and "Laser Ablation, Low Temperature Fabricated Yttria-Stabilized Zirconia Oriented Films". Additionally, Voevodin has contributed to books such as Nanostructured Thin Films and Nanodispersion Strengthened Coatings and Tribology of Mechanical Systems.



## Weihuan Zhao

Assistant Professor, Department of Mechanical and Energy Engineering

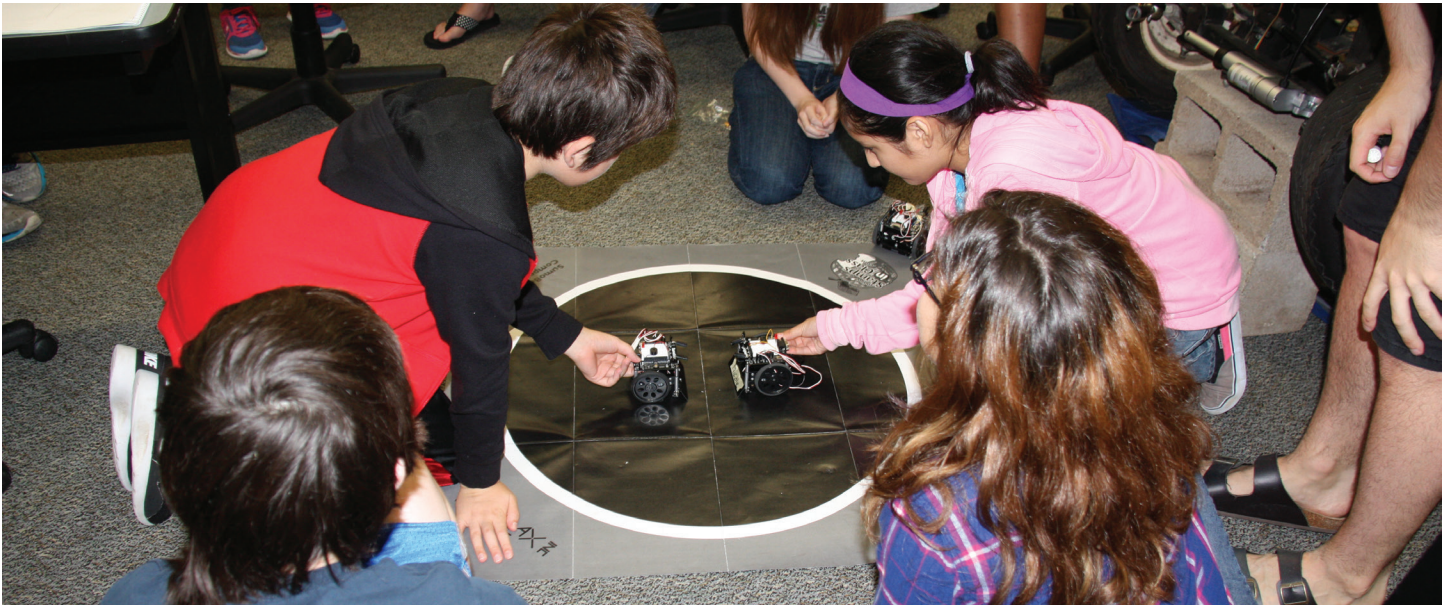
Ph.D.: Mechanical Engineering, Lehigh University, 2013

Expertise: thermal-fluid sciences, which include heat transfer, thermodynamics, and fluid dynamics. She focuses on heat transfer and computational fluid dynamics simulations by using programming languages (e.g., Matlab) as well as commercial software (e.g., COMSOL). She is also involved in experimental research activities in thermal-fluid sciences.

She previously worked for two years as a postdoctoral appointee in the Energy Systems Division at Argonne National Laboratory. At Argonne, Zhao's research included work on high-temperature latent heat thermal energy storage systems for large-scale electricity generation in concentrated solar power plants.



# SPONSORS



The College of Engineering would like to thank the following individuals and organizations for their contributions, which make possible everything that we do, such as the award-winning Computer Science and Engineering summer camps.

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### Tech Titan Award

Electrical Engineering faculty members Shengli Fu (in the center of the photo) and Yan Wan (on the right in the photo) received the 2015 Tech Titan of the Future – University Level award from The Metroplex Technology Business Council. UNT also won Tech Titan awards in 2012 and 2010.

The award recognizes higher education institutions in the Dallas-Fort Worth area that perpetuate tech-related knowledge transfer and also encourage and support students to choose engineering and technology related disciplines as a preferred career path. Fu and Wan received the award for demonstrating a creative, innovative approach that reaches out to students and other learning-minded professionals and related institutions.

Read more about Wan and other UNT Electrical Engineering researchers on page 14.